

## Xiaodong Liu

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### CONTACT INFORMATION

Johns Hopkins University  
Department of Biomedical Engineering and Neuroscience  
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### EDUCATION

**Johns Hopkins University**, Baltimore, Maryland USA

Postdoc Training, Neuroscience and Biomedical Engineering, 2004-2010

**Case Western Reserve University**, Cleveland, Ohio USA

Ph.D., Biomedical Engineering, 1999-2004

**Tsinghua University**, Beijing China

M.S., Biomedical Engineering, 1996-1999

**Zhejiang University**, Hangzhou China

B.S., Biomedical Engineering and Instrumentation, 1990-1995  
with Minor in Computer Science and Engineering

### RESEARCH EXPERIENCE

**Calcium Signals Lab (Dr. David Yue)**

7/06-present

Department of Biomedical Engineering and Neuroscience, Johns Hopkins University

- *Toward a Unified Mechanism of  $Ca_V$  channel Distal C-tails in Calmodulin-Channel Complex.*

Major Approach: Molecular Cloning, Electrophysiology and Optical Imaging (FRET).

**Molecular Interaction Lab (Dr. Min Li)**

10/04-6/06

Neuroscience Department and High Throughput Biology Center, Johns Hopkins University

- *Chemical Modulation of  $K_V$  Channels.*

Major Approach: Electrophysiology and Compound Screening.

**Neural Engineering Center (Dr. Dmitri Kourennyi)**

8/99-9/04

Department of Biomedical Engineering, Case Western Reserve University

- *Biophysics of Visual Information Processing by  $K_V$  and  $Ca_V$  Channels in Photoreceptors.*

Major Approach: Electrophysiology, Computational Models and Fluorescence Imaging.

**Medical Engineering and Health Technology Group (Dr. Jing Bai)**

9/96-7/99

Department of Electrical Engineering, Tsinghua University

- *A Home-based Client System for Tele-monitoring ECG and Blood Pressure.*

Major Approach: Programming (Visual C++/MFC); Development of Microcontroller System.

**Biosensor National Special Lab (Dr. Ping Wang)**

11/94-6/95

Department of Biomedical Engineering, Zhejiang University

- *Artificial Neural Network with Flexible Architecture for Electronic Nose.*

Major Approach: Algorithm Development; Clinical Trials of Diabetes Diagnostics.

## Independent

11/07-12/09

*in collaboration with* Biosensor National Special Lab (Dr. Ping Wang) and Medical Neurobiology Lab (Dr. Jianhong Luo), Zhejiang University.

- *Molecular Physiology of TRPP channels in Acid Sensing Neurons.*

Major Approach: Electrophysiology; Computational Models.

## HONORS AND AWARDS

Student Travel Award, School of Graduate Studies, Case Western Reserve University 2004

Student Travel Award, Biomedical Engineering Society, 2003

Whitaker Foundation Traineeship, BME Department, Case Western Reserve University, 1999-2000

GuangHua Scholarship, Tsinghua University, 1998

Student Research Award, Zhejiang University, 1994

Excellent Student Scholarship, Zhejiang University, 1990-1994

## PROFESSIONAL EXPERIENCE

### Employment

Engineer

7/95-9/96

Center of Computing and Electronics, Ministry of Railway, China

Research Fellow

10/04-Present

Johns Hopkins University, USA

### Scientific Membership

Biophysical Society, Society of Neuroscience, Association for Research in Vision and Ophthalmology, IEEE-EBME, Sigma Xi

### Reviewer

Annals of Biomedical Engineering (2003-), Proceedings of National Academy of Science (2006-), Journal of Pharmacological and Toxicological Methods (2009-), Journal of Healthcare Engineering (2010-)

### Other Services

2008 Session Chair, Gene Science, Engineering and Genomics, International Conference of Bioinformatics and Biomedical Engineering, Shanghai, China

## PUBLICATIONS

### Journal Articles

1. Wang P, Li R, Lin L and *Liu XD* (1998) Study on flexible neural network for odor recognition of electronic nose. **Pattern Recognition and Artificial Intelligence**, Vol. 4, 1998.

2. Kourennyi DE, *Liu XD* and Barnes S (2002) Modulation of rod photoreceptor potassium Kx current by divalent cations. **Annals of Biomedical Engineering** 30: 1196-1203. (selected by *Vir. J. Bio. Phys. Res. (2002) 4:11/MEMBRANE BIOPHYSICS*)

3. Kourennyi DE, *Liu XD*, Hart J, Mahmud F, Baldrige WH and Barnes S (2004). Reciprocal modulation of calcium dynamics at rod and cone photoreceptor synapses by nitric oxide. **Journal of Neurophysiology** 92: 477-83.

4. *Liu XD* and Kourennyi DE (2004) Effect of TEA on Kx channels and simulated light response in rod photoreceptors. **Annals of Biomedical Engineering** 32: 1428-42.

5. Sun H, *Liu XD*, Xiong Q, Shikano S and Li M (2006) Chronic inhibition of cardiac Kir2.1 and hERG potassium channels by celastrol with dual effects on both ion conductivity and protein trafficking. **Journal of Biological Chemistry** 281: 5877-5884. (selected as *Cover Story*)

6. Chen P, *Liu XD*, Wang B, Cheng G and Ping Wang (2009) A biomimetic taste receptor cell-based biosensor for electrophysiology recording and acidic sensation, **Sensors and Actuators, B: Chemical** 139: 576-583.
7. Chen P, *Liu XD*, Zhang W, Zhou J, Wang P, Yang W, and Luo J (2009) Modeling and simulation of ion channels and action potentials in taste receptor neurons, **Science China C Life Science** 11:1036-47. (Chinese Translation Published on 39: 149-160)
8. *Liu XD*, Yang PS, Yang W and Yue DT (2010) Enzyme-inhibitor-like tuning of  $\text{Ca}^{2+}$  channel connectivity with calmodulin, **Nature** 463: 968-972. (selected as Editor's Choice *Science Signaling*: N. R. Gough, Quantifying Interactions. Sci. Signal. 3, ec62 (2010); selected by *Faculty of 1000*, Gerald Zamponi, 12 Mar 2010)

#### *In Preparation*

1. Chen P<sup>#</sup>, Yang W<sup>#</sup>, Wang P, Luo J, Zhao J and *Liu XD*\* PKDL channels of TRPP family with proton- and calcium-dependent inhibition in sensing the offset of acid stimuli. (<sup>#</sup>*equal contribution*, \**corresponding author*)
2. *Liu XD*, Sun H and Li M A novel family of M-channel potentiators.
3. *Liu XD*\* and Kourennyi DE Differential modulation of L-type calcium channels in rod photoreceptors by nitric oxide. (\**corresponding author*)

#### **International Conference Proceedings**

1. *Liu XD* and Kourennyi DE (2004) Linear system analysis of ion channel modulation in rod photoreceptors under dim light conditions. Annual International Conference of the IEEE Engineering in Medicine and Biology - Proceedings, v 26 VI: 4037-40.
2. Chen P, Cheng G, Wang B, Wang P\* and *Liu XD*\* (2008) Design of a novel acid-sensing biosensor based on taste neurons and LAPS. In: 2nd International Conference on Bioinformatics and Biomedical Engineering, iCBBE 2008, pp 1561-1564 (\*corresponding authors)

#### **Conference Abstracts**

1. *Liu XD* and Kourennyi DE (2000) Modeling of effects of zinc on salamander rod photoreceptor potassium Kx current. *Annals. Biomed. Eng.* 28:S114.
2. *Liu XD* and Kourennyi DE (2001) Development of a microscopic electrochemical sensor for nitric oxide. *Annals Biomed. Eng.* 29:S131.
3. Kourennyi DE, *Liu XD* (2001) Effects of nitric oxide on photoreceptor light response: modeling study. *Invest. Ophthalmol. Vis. Sci.* 42:S369.
4. *Liu XD* and Kourennyi DE (2003) Concentration dependent effects of nitric oxide on rod photoreceptors. *Invest. Ophthalmol. Vis. Sci.* 44:S4160.
5. Kourennyi DE and *Liu XD* (2003) Effect of TEA on Kx channels and simulated light response in rod photoreceptors. *BMES*.
6. *Liu XD*, Ulatowski L and Kourennyi DE (2003) Simulation of the Light Response in Patch Clamp Recordings from Photoreceptors. *BMES*.
7. *Liu XD* and Kourennyi DE (2003) Nitric Oxide effects on simulated light response of photoreceptors. *BMES*.
8. *Liu XD* and Kourennyi DE (2004) D-S-Nitrosocysteine inhibits the calcium channels in rod photoreceptors. *Invest Ophthalmol Vis Sci.* 45:S1340.
9. *Liu XD*, Sun H and Li M (2007). A Novel Family of KCNQ/M Channel Potentiators Discovered

by Compound Screening. Biophysical Society Annual Meeting.

10. *Liu XD*, Yang PS and Yue DT (2008). Modulation of L-type Ca Channels by the Distal C-terminal of  $\text{Ca}_v1.4$ : Simultaneous Effects on  $\text{Ca}^{2+}$ -dependent Inactivation and Voltage-dependent Activation. Biophysical Society Annual Meeting.

11. Chen P, Yang W, Wang P, Luo J and *Liu XD* (2008) Temporal encoding of sour taste by ASIC and PKDL: a computational study, Society of Neuroscience Annual Meeting.

12. *Liu XD*, Yang PS, Wu V and Yue DT (2009),  $\text{Ca}_v1.4$  C-tail Segment (ICDI) Inhibits  $\text{Ca}_v$  Channel Inactivation by Competing with Calmodulin-Resolution by Holochannels and Calmodulin FRET Sensors, Biophysical Society Annual Meeting.

13. *Liu XD*, Yang PS, Wu V, Yang W and Yue DT (2009), The distal carboxy tail of  $\text{Ca}^{2+}$  channels retunes their calmodulin sensitivity into the neurobiological range, Society of Neuroscience Annual Meeting.

14. Chen P, Yang W, Wang P, Luo J, Zhao J and *Liu XD* (2009), PKDL channels of TRPP family sensing the offset of acid stimuli, Society of Neuroscience Annual Meeting.

15. *Liu XD*, Yang PS, Yang W and Yue DT (2010), Enzyme-inhibitor-like tuning of calcium channel connectivity with calmodulin, Biophysical Society Annual Meeting.

### Book Chapter

*Liu XD* and Bai J. Medical Information System for Telemedicine. Chapter 7 in Introduction to Telemedicine, 2000, Tsinghua University Press, ISBN:7302040494

### PRESENTATIONS AND TALKS

1. Modeling of effect of nitric oxide on photoreceptor light response. Canadian Physiological Society Annual Meeting, Mont Tremblant, Canada, January 2001.

2. Nitric oxide effects on simulated light response of photoreceptors. Biomedical Engineering Society Annual Meeting, Nashville, TN, October 2003.

3. Modulation of ion channels in photoreceptors. Neurological Sciences Institute, OSHU, Portland, OR August 2004.

4. Chemical modulation of  $\text{K}^+$  channels. Retina Group, University of Pennsylvania, Philadelphia, PA March 2006.

5. Modulation of ion channels: pharmacological and genetic perturbation of membrane excitability. Department of Biomedical Engineering, Zhejiang University, Hangzhou, China May 2008.

6. Distal carboxy tails and apoCaM vie for Ca channels. Center of Cell Dynamics, Johns Hopkins University, Baltimore, MD May 2009.

7. Tuning calcium channels with tails and calmodulin: convergence meets divergence. Physiology Department, University of Texas Southwestern Medical Center, Dallas, TX January 2010

8. Enzyme-inhibitor-like tuning of calcium channel connectivity with calmodulin. Biophysical Society 54th Annual Meeting, San Francisco, CA February 2010

9. Sensing with ion channels. Department of Biomedical Engineering, Tsinghua University, Beijing, China March 2010

10. Competitive tuning of calcium dependent inactivation: an inspiration from calcium channels in sensory receptors. School of Medicine, Zhejiang University, Hangzhou, China March 2010

11. A tale of tails: tuning  $\text{Ca}^{2+}$  channels by competing with calmodulin. School of Life Sciences,

Peking University, Beijing, China March 2010

## REFERENCES

### **David Yue, M.D., Ph.D.**

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### **Jianmin Cui, Ph.D.**

The Spencer T. Olin Associate Professor of Biomedical Engineering  
Associate Professor of Cell Biology & Physiology  
and Energy, Environmental & Chemical Engineering  
Washington University  
One Brookings Drive  
Campus Box 1097  
St. Louis, MO 63130 USA  
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### **Dmitri E. Kourennyi, Ph.D.**

Biology and SAGES Lecturer  
Department of Biology  
Case Western Reserve University  
10900 Euclid Ave.  
Cleveland, OH 44106 USA  
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### **Min Li, Ph.D.**

Professor of Neuroscience & Physiology  
& High Throughput Biology Center  
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